IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of

Applicant(s)	: Phelps, et al.
Serial No.	: 10/625,915
Filed	: July 23, 2003
Title	: NON-TOXIC CORROSION-PROTECTION CONVERSION COATS BASED ON RARE EARTH ELEMENTS
Docket No.	: UVD 0280 IA / UD 268
Examiner	: L. Zheng
Art Unit	: 1742

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

DECLARATION OF JEFFREY A. STURGILL

Jeffrey A. Sturgill, one of the applicants in the above-identified patent application, declares as follows:

1. I received a B.S degree in Geology from the University of Toledo in 1986. I was employed by the University of Dayton from November 1993 until September 2006. I have been working the area of corrosion-inhibiting pigments since 1996, and in the area of corrosion/materials degradation since 1985.

2. I am familiar with this application as well as the Office Action mailed September 10, 2007, including the rejections made by the Examiner therein. I am also familiar with the references cited by the Examiner in that Office Action including U.S. Patent No. 6,200,672 to Tadokoro (treated as equivalent to WO 98/48075).

3. I previously prepared solutions using Tadokoro's process and the organic compounds 2-hydroxynicotinic acid, catechol, dextrose (as a surrogate for γ-cyclodextrin) and salicylic acid (slightly less soluble than 2-hydroxynicotinic acid) using

the procedure set out in Tadokoro. See Declaration of Jeffrey A. Sturgill filed with the Amendment of June 26, 2007.

4. The solubility of the dextrose-containing solution was not determined because it was too high as discussed in the Declaration of Jeffrey A. Sturgill filed with the Amendment of June 26, 2007.

5. The catechol/ammonium cerium IV nitrate reaction was repeated because there was not enough product (which was almost entirely pure carbon) from the earlier reaction on which to perform the solubility test. The reaction was carried out in the same way as described in Declaration of Jeffrey A. Sturgill filed with the Amendment of June 26, 2007.

6. The solid reaction products prepared in accordance with Tadokoro were evaluated for their solubility characteristics. The three solid reaction products evaluated included: 1) salicylic acid/ammonium cerium IV nitrate; 2) catechol/ammonium cerium IV nitrate; and 3) 2-hydroxynicotinic acid/ammonium cerium IV nitrate.

The samples were prepared for solubility determination in a manner similar to that described in ASTM D-2448: Water-Soluble Salts in Pigments by Measuring the Specific Resistance of the Leachate of the Pigment. This specification describes weighing a mass of the pigment, and then contacting the mass of powdered pigment with nine times the mass of deionized water. In the specification, the specific resistance of the 'extracting' deionized water sample placed in contact with the pigment is then determined, in order to measure how many ions were placed into the water from the pigment. This allows for a determination of the Total Salts being solubilized by the water - in effect, measuring the total solubility of the pigment in water. For this effort, that information is only part of what is needed. A measure of the cerium being extracted from the pigment/resultant solid was needed. Therefore, the extracting water sample was analyzed by inductively coupled plasma (ICP) spectroscopy in order to derive the quantity of soluble cerium in each sample.

The ICP results for each sample are attached. Specifically, Sample 1 (reaction product of ammonium cerium IV nitrate and salicylic acid (Exhibit 1)) indicates a quantity of extracted cerium corresponding to an average of 1071 ppm (0.1 wt. %). Sample 2 (reaction product of ammonium cerium IV nitrate and catechol (Exhibit 2)) indicates a quantity of extracted cerium corresponding to an average of 6.5 ppm (0.0001 wt.%). Lastly, Sample 3 (reaction product of ammonium cerium IV nitrate and 2-hydroxynicotinic acid (Exhibit 3)) indicates a quantity of extracted cerium corresponding to an average of 81610 ppm (8.16 wt. %). As can be seen from the ICP data, smaller concentrations of other elements were detected.

Based upon a molecular weight for cerium of 140.1, these extracted concentrations correspond to cerium solubilities of:

Sample 1: 7.1 x 10-3 moles/liter
Sample 2: 4.3 x 10-5 moles/liter
Sample 3: 5.8 x 10-1 moles/liter

Tadokoro reported the solubility for the catechol and 2-hydroxynicotinic acid complexes as 0.01 mol/l or less.

7. The cerium content of the catechol/ammonium cerium IV nitrate reaction product is extremely low (0.0001 wt.%). The measured cerium content is probably some residual, reduced starting material. The reaction product was previously tested to be almost pure carbon. See Declaration of Jeffrey A. Sturgill filed with the Amendment of June 26, 2007.

8. The portion of the extract for all three solid materials that was not used for ICP analysis was then subjected to redox determination. This analysis was previously described in Paragraph 12 of the Declaration of Jeffrey A. Sturgill filed with the Amendment of June 26, 2007, but without the digestion procedure described because the extract was already in liquid form. Specifically, the titration was the procedure described on page 246 of Reagent Chemicals - Specifications and Procedures 10th by the ACS

Committee on Analytical Reagents, 2006. The 9:1 water/solid extract described above was titrated with a 0.1 N ferrous sulfate solution in the presence of a redox probe in order to determine if the cerium present was trivalent or tetravalent. These titration curves for Samples 1 through 3 indicate no change in oxidation state of the cerium in the presence of the ferrous reducing agent. See Exhibits 4-6. Therefore, there is no cerium (IV) present.

9. Tadokoro does not describe having performed any procedure to determine the valence of the rare earth metal in the complex formed by the process described there.

10. The process described in Tadokoro is non-enabling for making a tetravalent cerium complex, and it would take undue experimentation to produce a tetravalent cerium complex using Tadokoro's process.

The declarant further states that the above statements were made with the knowledge that willful false statements and the like are punishable by fine and/or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this application or any patent resulting therefrom.

Date: 1-9-07

Jeffrey A. Sturgill

Ag 338.289	0.001625	ppm	0.001089	67.0	11.2457	1.80514 ppm	Sc 361.383	
Al 237.312	0.008277	ppm	0.003231	39.0	13.4822	9.19622 ppm	Sc 361.383	
Al 308.215	0.002182uv	ppm	0.003556	162.9	163.890	2.42498 ppm	Sc 361.383	
Al 394.401	0.124590	ppm	0.002084	1.7	668.328	138.434 ppm	Sc 361.383	
Al 396.152	0.004138	ppm	0.000735	17.8	234.666	4.59755 ppm	Sc 361.383	
As 188.980	0.004489uv	ppm	0.006181	137.7	3.06343	4.98796 ppm	Sc 361.383	
As 193.696	-0.000513uv	ppm	0.003127	610.2	1.45237	-0.569469 ppm	Sc 361.383	
As 234.984	0.095353	ppm	0.010430	10.9	20.2144	105.947 ppm	Sc 361.383	
B 208.956	0.016566	ppm	0.001797	10.8	5.08990	18.4061 ppm	Sc 361.383	
B 249.678	0.015911	ppm	0.000539	3.4	64.4638	17.6793 ppm	Sc 361.383	18
B 249.772	0.015867	ppm	0.000432	2.7	124.353	17.6299 ppm	Sc 361.383	
Ba 233.527	0.007351	ppm	0.000115	1.6	157.995	8.16796 ppm	Sc 361.383	
Ba 455.403	0.006820	ppm	0.000114	1.7	2962.60	7.57770 ppm	Sc 361.383	8
Ba 493.408	0.006523	ppm	0.000145	2.2	2933.37	7.24797 ppm	Sc 361.383	
Bi 222.821	-0.004332uv	ppm	0.007439	171.7	6.34679	-4.81316 ppm	Sc 361.383	
Bi 223.061	-0.002177uv	ppm	0.001594	73.3	1.57852	-2.41841 ppm	Sc 361.383	
Ca 393.366	0.015970	ppm	0.000314	2.0	13380.0	17.7450 ppm	Sc 361.383	17
Ca 396.847	0.014858	ppm	0.000286	1.9	22868.9	16.5089 ppm	Sc 361.383	
Cd 214.439	-0.000484uv	ppm	0.000101	20.8	9.43964	-0.537951 ppm	Sc 361.383	
Cd 226.502	-0.000629uv	ppm	0.000206	32.7	11.3877	-0.698795 ppm	Sc 361.383	
Cd 228.802	-0.000236uv	ppm	0.000139	58.8	21.4422	-0.261786 ppm	Sc 361.383	
Ce 407.570	0.961956	ppm	0.004571	0.5	3452.30	1068.84 ppm	Sc 361.383	Avg. =
Ce 418.659	0.949224	ppm	0.016864	1.8	6368.79	1054.69 ppm	Sc 361.383	1071 ppm
Ce 446.021	0.983613	ppm	0.009785	1.0	6928.29	1092.90 ppm	Sc 361.383	
Co 228.615	-0.001020uv	ppm	0.000571	56.0	2.78702	-1.13319 ppm	Sc 361.383	
Co 230.786	-0.001015uv	ppm	0.000213	21.0	2.97918	-1.12739 ppm	Sc 361.383	
Co 238.892	-0.000796uv	ppm	0.000227	28.5	0.453564	-0.884987 ppm	Sc 361.383	
Cr 205.560	-0.000166uv	ppm	0.000580	348.8	1.64633	-0.184609 ppm	Sc 361.383	
Cr 206.158	0.001156	ppm	0.000871	75.4	1.54796	1.28401 ppm	Sc 361.383	
Cr 267.716	-0.000689uv	ppm	0.000357	51.8	1.76105	-0.765230 ppm	Sc 361.383	
Cu 213.598	0.000323	ppm	0.000324	100.3	2.87198	0.359328 ppm	Sc 361.383	
Cu 324.754	0.000727	ppm	0.000214	29.4	74.8020	0.807281 ppm	Sc 361.383	
Cu 327.395	0.002441	ppm	0.001159	47.5	90.2475	2.71271 ppm	Sc 361.383	
Fe 234.350	0.013650	ppm	0.000709	5.2	56.9161	15.1663 ppm	Sc 361.383	
Fe 238.204	0.011741	ppm	0.000072	0.6	143.163	13.0450 ppm	Sc 361.383	13
Fe 259.940	0.012032	ppm	0.000198	1.6	103.599	13.3690 ppm	Sc 361.383	
Hg 184.887	0.001055	ppm	0.001188	112.6	1.27863	1.17198 ppm	Sc 361.383	
Hg 194.164	0.001115	ppm	0.000707	63.4	2.22239	1.23879 ppm	Sc 361.383	
Hg 253.652	-0.000512uv	ppm	0.000217	42.3	5.67644	-0.568908 ppm	Sc 361.383	
K 766.491	0.001388	ppm	0.001041	75.0	569.479	1.54171 ppm	Sc 361.383	
K 769.897	0.012038	ppm	0.004695	39.0	14527.6	13.3753 ppm	Sc 361.383	
Li 610.365	0.000979	ppm	0.000652	66.5	50.8482	1.08819 ppm	Sc 361.383	
Li 670.783	0.002479	ppm	0.000032	1.3	14236.6	2.75453 ppm	Sc 361.383	
Mg 279.553	-0.001352uv	ppm	0.000018	1.3	606.081	-1.50184 ppm	Sc 361.383	
Mg 280.270	-0.000974uv	ppm	0.000018	1.8	156.918	-1.08170 ppm	Sc 361.383	
Mg 285.213	0.001470	ppm	0.000063	4.3	51.1048	1.63296 ppm	Sc 361.383	

EXHIBIT
1

Mo 204.598	-0.009045uv	ppm	0.000693	7.7	4.35845	-10.0501 ppm	Sc 361.383	
Mo 284.824	-0.00662luv	ppm	0.000159	2.4	13.4147	-7.35614 ppm	Sc 361.383	
Na 588.995	0.065301	ppm	0.000883	1.4	32000.6	72.5569 ppm	Sc 361.383	74
Na 589.592	0.068574	ppm	0.001794	2.6	21387.2	76.1929 ppm	Sc 361.383	
Ni 216.555	-0.000028uv	ppm	0.001088	3952.8	4.18897	-0.030591 ppm	Sc 361.383	
Ni 221.648	-0.000454uv	ppm	0.000185	40.8	1.05926	-0.504612 ppm	Sc 361.383	
Ni 230.299	-0.000807uv	ppm	0.000677	83.8	2.98203	-0.896929 ppm	Sc 361.383	
Ni 231.604	-0.000821uv	ppm	0.000828	100.8	2.71141	-0.912458 ppm	Sc 361.383	
P 177.434	0.010203	ppm	0.004561	44.7	1.32313	11.3369 ppm	Sc 361.383	
P 213.618	0.007218	ppm	0.003880	53.7	4.67412	8.02004 ppm	Sc 361.383	
P 214.914	0.018367	ppm	0.015168	82.6	2.09358	20.4078 ppm	Sc 361.383	
Pb 182.143	-0.005539uv	ppm	0.001670	30.2	0.796063	-6.15406 ppm	Sc 361.383	
Pb 220.353	0.002398	ppm	0.001836	76.6	4.70826	2.66451 ppm	Sc 361.383	
Pb 283.305	-0.009214uv	ppm	0.006788	73.7	35.5778	-10.2383 ppm	Sc 361.383	
Pd 229.651	-0.007789uv	ppm	0.001310	16.8	2.22612	-8.65464 ppm	Sc 361.383	
Pd 340.458	0.001531	ppm	0.000571	37.3	28.8556	1.70126 ppm	Sc 361.383	
Pd 360.955	0.034819	ppm	0.003645	10.5	81.8946	38.6880 ppm	Sc 361.383	
Pt 177.648	-0.000866uv	ppm	0.003857	445.4	0.999247	-0.962212 ppm	Sc 361.383	
Pt 203.646	-0.004993uv	ppm	0.001701	34.1	1.21320	-5.54749 ppm	Sc 361.383	
Pt 214.424	0.003517	ppm	0.003177	90.3	3.14338	3.90755 ppm	Sc 361.383	
S 180.669	0.064413	ppm	0.021959	34.1	13.2490	71.5701 ppm	Sc 361.383	70
S 181.972	0.062306	ppm	0.014581	23.4	16.5345	69.2291 ppm	Sc 361.383	
Sb 206.834	0.011364	ppm	0.003626	31.9	4.06128	12.6263 ppm	Sc 361.383	
Sb 217.582	0.009036uv	ppm	0.008235	91.1	2.82953	10.0399 ppm	Sc 361.383	
Sb 231.146	-0.000866uv	ppm	0.004832	558.0	2.89582	-0.962148 ppm	Sc 361.383	
Si 250.690	0.036433	ppm	0.003621	9.9	54.5725	40.4816 ppm	Sc 361.383	
Si 251.611	0.034397	ppm	0.001823	5.3	59.8793	38.2186 ppm	Sc 361.383	39
Si 288.158	0.034174	ppm	0.003222	9.4	168.691	37.9706 ppm	Sc 361.383	
Sn 189.927	0.005784	ppm	0.001762	30.5	1.21575	6.42681 ppm	Sc 361.383	
Sn 235.485	0.045012	ppm	0.002181	4.8	8.94595	50.0137 ppm	Sc 361.383	
Sn 283.998	-0.008765uv	ppm	0.003098	35.4	4.54500	-9.73896 ppm	Sc 361.383	
Sr 216.596	-0.001224uv	ppm	0.000324	26.4	1.35800	-1.36049 ppm	Sc 361.383	
Sr 407.771	-0.001985uv	ppm	0.000012	0.6	685.267	-2.20515 ppm	Sc 361.383	
Sr 421.552	-0.001787uv	ppm	0.000021	1.2	272.883	-1.98540 ppm	Sc 361.383	
Ti 334.941	-0.000149uv	ppm	0.000151	101.5	31.3931	-0.165063 ppm	Sc 361.383	
Ti 336.122	0.001316uv	ppm	0.002502	190.1	4520.28	1.46217 ppm	Sc 361.383	
Ti 337.280	0.001496	ppm	0.000735	49.1	17.3186	1.66205 ppm	Sc 361.383	
W 207.912	0.054019	ppm	0.015929	29.5	23.5577	60.0210 ppm	Sc 361.383	
W 209.475	0.052646	ppm	0.019152	36.4	13.0925	58.4957 ppm	Sc 361.383	
W 220.449	0.048642	ppm	0.017152	35.3	20.2975	54.0467 ppm	Sc 361.383	
Zn 202.548	0.007622	ppm	0.000170	2.2	37.8257	8.46934 ppm	Sc 361.383	9
Zn 206.200	0.007490	ppm	0.000269	3.6	8.48171	8.32232 ppm	Sc 361.383	
Zn 213.857	0.008242	ppm	0.000066	0.8	68.0610	9.15741 ppm	Sc 361.383	
Zr 339.198	0.005855	ppm	0.000266	4.5	25.7583	6.50603 ppm	Sc 361.383	
Zr 343.823	0.003817	ppm	0.000301	7.9	103.963	4.24128 ppm	Sc 361.383	
Zr 349.619	0.003558	ppm	0.000455	12.8	104.760	3.95268 ppm	Sc 361.383	

2- JS (Samp)		12/10/2007, 11:42:46 AM		Tube 18			
Weight: 0.41		Volume: 100		Dilution: 1			
Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.	IS
Ag 328.068	0.000921	ppm	0.000342	37.1	27.6180	0.224527 ppm	Sc 361.383
Ag 338.289	0.000770	ppm	0.000709	92.0	10.0808	0.187917 ppm	Sc 361.383
Al 237.312	-0.005150uv	ppm	0.000857	16.6	4.82992	-1.25602 ppm	Sc 361.383
Al 308.215	-0.003225uv	ppm	0.001049	32.5	150.888	-0.786600 ppm	Sc 361.383
Al 394.401	-0.000027uv	ppm	0.001810	6777.7	51.2799	-0.006514 ppm	Sc 361.383
Al 396.152	-0.003059uv	ppm	0.000522	17.1	99.9389	-0.746116 ppm	Sc 361.383
As 188.980	0.000905uv	ppm	0.002296	253.8	2.66204	0.220666 ppm	Sc 361.383
As 193.696	-0.004375uv	ppm	0.005054	115.5	1.02442	-1.06697 ppm	Sc 361.383
As 234.984	0.044855	ppm	0.016260	36.3	13.5156	10.9402 ppm	Sc 361.383
B 208.956	0.006648	ppm	0.003521	53.0	2.56871	1.62147 ppm	Sc 361.383
B 249.678	0.000995	ppm	0.001059	106.4	17.2001	0.242691 ppm	Sc 361.383
B 249.772	0.001897	ppm	0.000290	15.3	34.4731	0.462796 ppm	Sc 361.383
Ba 233.527	-0.000304uv	ppm	0.000066	21.7	22.6355	-0.074025 ppm	Sc 361.383
Ba 455.403	-0.001143uv	ppm	0.000119	10.4	432.988	-0.278874 ppm	Sc 361.383
Ba 493.408	-0.001412uv	ppm	0.000144	10.2	390.893	-0.344377 ppm	Sc 361.383
Bi 222.821	0.000457uv	ppm	0.009684	2119.5	7.35762	0.111436 ppm	Sc 361.383
Bi 223.061	0.000458uv	ppm	0.002614	570.2	3.23831	0.111820 ppm	Sc 361.383
Ca 393.366	0.000515	ppm	0.000174	33.8	4915.07	0.125684 ppm	Sc 361.383
Ca 396.847	0.001181	ppm	0.000179	15.2	8706.88	0.287959 ppm	Sc 361.383
Cd 214.439	-0.000854uv	ppm	0.000012	1.4	6.63822	-0.208309 ppm	Sc 361.383
Cd 226.502	-0.000843uv	ppm	0.000073	8.7	8.75923	-0.205536 ppm	Sc 361.383
Cd 228.802	-0.000450uv	ppm	0.000258	57.4	20.3767	-0.109680 ppm	Sc 361.383
Ce 407.570	0.028106	ppm	0.006013	21.4	167.409	6.85508 ppm	Sc 361.383
Ce 418.659	0.028558	ppm	0.002843	10.0	202.971	6.96529 ppm	Sc 361.383
Ce 446.021	0.024801	ppm	0.004865	19.6	201.498	6.04908 ppm	Sc 361.383
Co 228.615	-0.001122uv	ppm	0.000555	49.4	2.47593	-0.273780 ppm	Sc 361.383
Co 230.786	-0.000807uv	ppm	0.000320	39.7	3.72916	-0.196925 ppm	Sc 361.383
Co 238.892	-0.000673uv	ppm	0.000127	18.9	0.998891	-0.164157 ppm	Sc 361.383
Cr 205.560	0.000038uv	ppm	0.000605	1581.1	1.99087	0.009330 ppm	Sc 361.383
Cr 206.158	0.000162uv	ppm	0.000416	257.6	1.00420	0.039405 ppm	Sc 361.383
Cr 267.716	-0.000467uv	ppm	0.000402	86.1	4.18367	-0.113925 ppm	Sc 361.383
Cu 213.598	-0.000435uv	ppm	0.000307	70.7	1.49936	-0.106003 ppm	Sc 361.383
Cu 324.754	-0.000315uv	ppm	0.000474	150.6	63.9295	-0.076865 ppm	Sc 361.383
Cu 327.395	0.001475	ppm	0.000217	14.7	79.5229	0.359812 ppm	Sc 361.383
Fe 234.350	0.002467	ppm	0.002363	95.8	17.8176	0.601635 ppm	Sc 361.383
Fe 238.204	0.001682uv	ppm	0.002823	167.8	35.7796	0.410321 ppm	Sc 361.383
Fe 259.940	0.001609uv	ppm	0.002762	171.7	28.3308	0.392394 ppm	Sc 361.383
Hg 184.887	0.000438	ppm	0.000562	128.3	0.840625	0.106763 ppm	Sc 361.383
Hg 194.164	-0.000255uv	ppm	0.000661	258.9	0.870229	-0.062259 ppm	Sc 361.383
Hg 253.652	-0.001110uv	ppm	0.000678	61.1	4.22157	-0.270665 ppm	Sc 361.383

Avg. = 6.5 ppm

EXHIBIT 2

PHOLAB-Bayonne, N. J.

Mg 279.553	0.000894	ppm	0.000071	8.0	1069.82	0.218063 ppm	Sc 361.383
Mg 280.270	0.001281	ppm	0.000103	8.1	278.805	0.312406 ppm	Sc 361.383
Mg 285.213	0.004079	ppm	0.000152	3.7	92.2989	0.994881 ppm	Sc 361.383
Mn 257.610	-0.000871uv	ppm	0.000072	8.3	31.1805	-0.212542 ppm	Sc 361.383
Mn 259.372	-0.000884uv	ppm	0.000047	5.3	14.8646	-0.215504 ppm	Sc 361.383
Mn 294.921	-0.000801uv	ppm	0.000343	42.9	11.0347	-0.195303 ppm	Sc 361.383
Mo 202.032	-0.011445uv	ppm	0.000491	4.3	1.28701	-2.79136 ppm	Sc 361.383
Mo 204.598	-0.011286uv	ppm	0.001411	12.5	2.51284	-2.75278 ppm	Sc 361.383
Mo 284.824	-0.008988uv	ppm	0.001426	15.9	8.15486	-2.19231 ppm	Sc 361.383
Na 588.995	0.010173	ppm	0.000430	4.2	7307.46	2.48128 ppm	Sc 361.383
Na 589.592	0.006590	ppm	0.000943	14.3	7455.45	1.60727 ppm	Sc 361.383
Ni 216.555	-0.001096uv	ppm	0.000577	52.7	2.34818	-0.267273 ppm	Sc 361.383
Ni 221.648	0.000124uv	ppm	0.000620	500.5	1.60774	0.030217 ppm	Sc 361.383
Ni 230.299	-0.001060uv	ppm	0.000550	51.9	2.37029	-0.258550 ppm	Sc 361.383
Ni 231.604	-0.000371uv	ppm	0.000485	130.6	3.55646	-0.090607 ppm	Sc 361.383
P 177.434	0.002624uv	ppm	0.007300	278.2	0.673041	0.639921 ppm	Sc 361.383
P 213.618	-0.000950uv	ppm	0.005096	536.6	2.62700	-0.231628 ppm	Sc 361.383
P 214.914	-0.011222uv	ppm	0.007734	68.9	0.413285	-2.73711 ppm	Sc 361.383
Pb 182.143	0.000736uv	ppm	0.004558	619.2	1.20841	0.179515 ppm	Sc 361.383
Pb 220.353	-0.001255uv	ppm	0.001991	158.6	1.92572	-0.306152 ppm	Sc 361.383
Pb 283.305	-0.003654uv	ppm	0.006540	179.0	38.8122	-0.891193 ppm	Sc 361.383
Pd 229.651	-0.000613uv	ppm	0.002017	329.2	5.89608	-0.149437 ppm	Sc 361.383
Pd 340.458	-0.000555uv	ppm	0.000785	141.6	21.8310	-0.135257 ppm	Sc 361.383
Pd 360.955	0.000455uv	ppm	0.001288	283.2	17.9166	0.110911 ppm	Sc 361.383
Pt 177.648	-0.000670uv	ppm	0.007222	1077.7	1.01198	-0.163448 ppm	Sc 361.383
Pt 203.646	-0.005522uv	ppm	0.002151	38.9	1.14187	-1.34690 ppm	Sc 361.383
Pt 214.424	0.002582uv	ppm	0.002954	114.4	2.72013	0.629638 ppm	Sc 361.383
S 180.669	-0.122382uv	ppm	0.001529	1.2	6.75390	-29.8492 ppm	Sc 361.383
S 181.972	-0.129521uv	ppm	0.007033	5.4	7.76977	-31.5904 ppm	Sc 361.383
Sb 206.834	0.001390uv	ppm	0.002638	189.8	1.84643	0.339003 ppm	Sc 361.383
Sb 217.582	0.001989uv	ppm	0.003184	160.1	1.22716	0.485030 ppm	Sc 361.383
Sb 231.146	-0.011998uv	ppm	0.000987	8.2	0.060165	-2.92630 ppm	Sc 361.383
Si 250.690	-0.001436uv	ppm	0.002095	145.9	16.5388	-0.350310 ppm	Sc 361.383
Si 251.611	-0.001086uv	ppm	0.000419	38.6	16.5727	-0.264974 ppm	Sc 361.383
Si 288.158	-0.001797uv	ppm	0.001751	97.4	84.1267	-0.438288 ppm	Sc 361.383
Sn 189.927	0.001344uv	ppm	0.001821	135.5	0.514479	0.327768 ppm	Sc 361.383
Sn 235.485	0.020424	ppm	0.013564	66.4	5.20477	4.98155 ppm	Sc 361.383
Sn 283.998	-0.004419uv	ppm	0.003626	82.1	7.58312	-1.07773 ppm	Sc 361.383
Sr 216.596	-0.001041uv	ppm	0.000405	38.9	1.92253	-0.253987 ppm	Sc 361.383
Sr 407.771	-0.002284uv	ppm	0.000009	0.4	284.608	-0.557090 ppm	Sc 361.383
Sr 421.552	-0.002033uv	ppm	0.000026	1.3	69.7692	-0.495967 ppm	Sc 361.383
Ti 334.941	-0.000544uv	ppm	0.000104	19.2	9.31733	-0.132565 ppm	Sc 361.383
Ti 336.122	-0.001479uv	ppm	0.004443	300.3	4429.77	-0.360792 ppm	Sc 361.383
Ti 337.280	0.001327	ppm	0.000559	42.1	15.0662	0.323556 ppm	Sc 361.383
W 207.912	0.002611	ppm	0.000814	31.2	2.99455	0.636805 ppm	Sc 361.383
W 209.475	-0.003569uv	ppm	0.001641	46.0	1.76850	-0.870495 ppm	Sc 361.383

Label	Ratio	Int. (c/s)	SD(Int)	%RSD
Sc 335.372	1.00838	54551.8	692.988	1.3
Sc 361.383	1.01430	85910.1	1182.709	1.4
Sc 363.074	1.00295	20385.9	416.957	2.0
Sc 424.682	1.02635	65728.6	843.698	1.3

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Sc 361.383	1.01430	85910.1	1182.709	1.4
Sc 363.074	1.00295	20385.9	416.957	2.0
Sc 424.682	1.02635	65728.6	843.698	1.3

3- JS (Samp) **12/10/2007, 11:50:38 AM** **Tube 19**
Weight: 0.1 **Volume: 100** **Dilution: 1**

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.	IS
Ag 328.068	0.026105	ppm	0.001287	4.9	358.221	26.1050 ppm	Sc 361.383
Ag 338.289	0.025171	ppm	0.000754	3.0	43.3597	25.1714 ppm	Sc 361.383
Al 237.312	0.028340	ppm	0.003601	12.7	26.4114	28.3397 ppm	Sc 361.383
Al 308.215	0.057203	ppm	0.000675	1.2	296.182	57.2029 ppm	Sc 361.383
Al 394.401	10.8704x	ppm	0.015898	0.1	53876.8	10870.4 ppm	Sc 361.383
Al 396.152	0.103606	ppm	0.014992	14.5	2096.74	103.606 ppm	Sc 361.383
As 188.980	-0.009494uv	ppm	0.005764	60.7	1.49754	-9.49421 ppm	Sc 361.383
As 193.696	-0.007416uv	ppm	0.004732	63.8	0.687385	-7.41614 ppm	Sc 361.383
As 234.984	0.210811	ppm	0.015360	7.3	35.5309	210.811 ppm	Sc 361.383
B 208.956	0.024253	ppm	0.003583	14.8	7.04414	24.2528 ppm	Sc 361.383
B 249.678	0.026916	ppm	0.000854	3.2	99.3344	26.9164 ppm	Sc 361.383
B 249.772	0.029638	ppm	0.000645	2.2	212.957	29.6380 ppm	Sc 361.383
Ba 233.527	-0.000854uv	ppm	0.000265	31.0	12.9036	-0.853843 ppm	Sc 361.383
Ba 455.403	-0.001370uv	ppm	0.000041	3.0	360.875	-1.37040 ppm	Sc 361.383
Ba 493.408	-0.000271uv	ppm	0.000091	33.5	756.516	-0.270828 ppm	Sc 361.383
Bi 222.821	-0.016004uv	ppm	0.005075	31.7	3.88297	-16.0039 ppm	Sc 361.383
Bi 223.061	0.003142	ppm	0.002084	66.3	4.92885	3.14230 ppm	Sc 361.383
Ca 393.366	0.143266	ppm	0.000575	0.4	83101.0	143.266 ppm	Sc 361.383
Ca 396.847	0.007374	ppm	0.000108	1.5	15119.3	7.37360 ppm	Sc 361.383
Cd 214.439	0.000144	ppm	0.000118	81.9	14.2006	0.144496 ppm	Sc 361.383
Cd 226.502	0.001022	ppm	0.000111	10.8	31.6891	1.02227 ppm	Sc 361.383
Cd 228.802	0.001714	ppm	0.000218	12.7	31.1482	1.71449 ppm	Sc 361.383
Ce 407.570	81.0450x	ppm	0.091846	0.1	285150	81045.0 ppm	Sc 361.383
Ce 418.659	80.8462x	ppm	0.458674	0.6	541450	80846.2 ppm	Sc 361.383
Ce 446.021	82.9391x	ppm	0.627097	0.8	581908	82939.1 ppm	Sc 361.383
Co 228.615	0.001210	ppm	0.000693	57.3	9.54536	1.20973 ppm	Sc 361.383
Co 230.786	0.004663	ppm	0.000190	4.1	23.5228	4.66253 ppm	Sc 361.383
Co 238.892	-0.000740uv	ppm	0.000056	7.6	0.705078	-0.739554 ppm	Sc 361.383
Cr 205.560	0.008068	ppm	0.000508	6.3	15.5265	8.06833 ppm	Sc 361.383
Cr 206.158	0.007592	ppm	0.000722	9.5	5.06906	7.59248 ppm	Sc 361.383
Cr 267.716	0.005238	ppm	0.000170	3.3	66.5452	5.23759 ppm	Sc 361.383
Cu 213.598	0.014996	ppm	0.000718	4.8	29.4406	14.9956 ppm	Sc 361.383
Cu 324.754	-0.001975uv	ppm	0.000110	5.6	46.6102	-1.97452 ppm	Sc 361.383
Cu 327.395	-0.003474uv	ppm	0.000945	27.2	24.5884	-3.47401 ppm	Sc 361.383

25

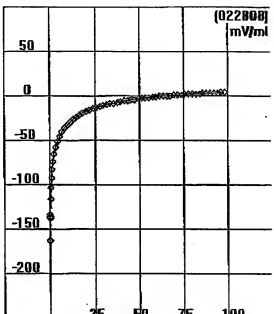
Avg = 81610 ppm

EXHIBIT
FISCHER-Abrams, N. J.

Hg 194.164	0.002343	ppm	0.000734	31.3	3.43383	2.34250 ppm	Sc 361.383
Hg 253.652	-0.003801uv	ppm	0.000910	23.9	-2.32983	-3.80126 ppm	Sc 361.383
K 766.491	-0.001121uv	ppm	0.000892	79.6	449.471	-1.12060 ppm	Sc 361.383
K 769.897	-0.026280uv	ppm	0.007021	26.7	12900.8	-26.2798 ppm	Sc 361.383
Li 610.365	0.002133	ppm	0.001077	50.5	105.009	2.13314 ppm	Sc 361.383
Li 670.783	0.000073	ppm	0.000034	46.5	5616.92	0.072558 ppm	Sc 361.383
Mg 279.553	0.006676	ppm	0.000099	1.5	2263.75	6.67586 ppm	Sc 361.383
Mg 280.270	0.002200	ppm	0.000085	3.8	328.486	2.19974 ppm	Sc 361.383
Mg 285.213	0.004044	ppm	0.000172	4.2	91.7467	4.04404 ppm	Sc 361.383
Mn 257.610	-0.000286uv	ppm	0.000042	14.8	74.2138	-0.286297 ppm	Sc 361.383
Mn 259.372	0.000184	ppm	0.000114	61.8	65.7486	0.184040 ppm	Sc 361.383
Mn 294.921	0.001981	ppm	0.000243	12.3	61.0384	1.98100 ppm	Sc 361.383
Mo 202.032	-0.009091uv	ppm	0.000249	2.7	4.32455	-9.09147 ppm	Sc 361.383
Mo 204.598	-0.007914uv	ppm	0.000735	9.3	5.28948	-7.91447 ppm	Sc 361.383
Mo 284.824	-0.003071uv	ppm	0.000418	13.6	21.2989	-3.07109 ppm	Sc 361.383
Na 588.995	0.032237	ppm	0.001915	5.9	17190.3	32.2368 ppm	Sc 361.383 40
Na 589.592	0.044784	ppm	0.000240	0.5	16040.2	44.7843 ppm	Sc 361.383
Ni 216.555	0.021337	ppm	0.000203	1.0	41.0030	21.3372 ppm	Sc 361.383
Ni 221.648	-0.001186uv	ppm	0.000327	27.6	0.364986	-1.18583 ppm	Sc 361.383
Ni 230.299	0.004188	ppm	0.000418	10.0	15.0690	4.18806 ppm	Sc 361.383
Ni 231.604	-0.000106uv	ppm	0.000379	358.5	4.05582	-0.105737 ppm	Sc 361.383
P 177.434	0.036860	ppm	0.001690	4.6	3.60943	36.8598 ppm	Sc 361.383
P 213.618	0.005880	ppm	0.001011	17.2	4.33868	5.87969 ppm	Sc 361.383
P 214.914	0.023115	ppm	0.014303	61.9	2.36318	23.1145 ppm	Sc 361.383
Pb 182.143	0.036325	ppm	0.004048	11.1	3.54721	36.3252 ppm	Sc 361.383
Pb 220.353	0.035753	ppm	0.003744	10.5	30.1130	35.7528 ppm	Sc 361.383
Pb 283.305	-0.014380uv	ppm	0.005781	40.2	32.5731	-14.3803 ppm	Sc 361.383
Pd 229.651	-0.025612uv	ppm	0.005900	23.0	-6.88811	-25.6118 ppm	Sc 361.383
Pd 340.458	0.080744	ppm	0.003781	4.7	295.645	80.7439 ppm	Sc 361.383
Pd 360.955	3.05631x	ppm	0.007109	0.2	5707.18	3056.31 ppm	Sc 361.383
Pt 177.648	0.000092uv	ppm	0.007029	7629.9	1.06155	0.092131 ppm	Sc 361.383
Pt 203.646	0.397415	ppm	0.002561	0.6	55.4158	397.415 ppm	Sc 361.383
Pt 214.424	0.011851	ppm	0.003033	25.6	6.91495	11.8510 ppm	Sc 361.383
S 180.669	-0.032183uv	ppm	0.007466	23.2	9.89024	-32.1826 ppm	Sc 361.383
S 181.972	-0.012482uv	ppm	0.020699	165.8	13.1173	-12.4820 ppm	Sc 361.383
Sb 206.834	0.000837uv	ppm	0.002049	244.8	1.72372	0.837360 ppm	Sc 361.383
Sb 217.582	0.004133uv	ppm	0.006428	155.5	1.71475	4.13309 ppm	Sc 361.383
Sb 231.146	0.085772	ppm	0.004125	4.8	24.9653	85.7720 ppm	Sc 361.383
Si 250.690	0.308348	ppm	0.003671	1.2	327.665	308.348 ppm	Sc 361.383
Si 251.611	0.293107	ppm	0.002292	0.8	375.631	293.107 ppm	Sc 361.383 300
Si 288.158	0.364334	ppm	0.000672	0.2	944.874	364.334 ppm	Sc 361.383
Sn 189.927	0.056724	ppm	0.003912	6.9	9.26087	56.7237 ppm	Sc 361.383
Sn 235.485	0.083649	ppm	0.007522	9.0	14.8247	83.6487 ppm	Sc 361.383
Sn 283.998	0.038893	ppm	0.004385	11.3	37.8579	38.8928 ppm	Sc 361.383
Sr 216.596	-0.001193uv	ppm	0.000155	13.0	1.45497	-1.19299 ppm	Sc 361.383
Sr 407.771	0.003588	ppm	0.000061	1.7	8141.80	3.58799 ppm	Sc 361.383

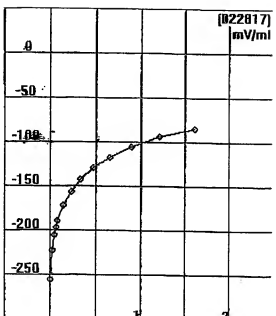
Zn 202.548	0.005466	ppm	0.000212	3.9	29.0883	5.46624 ppm	Sc 361.383
Zn 206.200	0.007312	ppm	0.000216	3.0	8.32183	7.31213 ppm	Sc 361.383
Zn 213.857	0.001973	ppm	0.000132	6.7	24.7303	1.97315 ppm	Sc 361.383
Zr 339.198	0.006596	ppm	0.000211	3.2	34.3309	6.59574 ppm	Sc 361.383
Zr 343.823	0.023079	ppm	0.000393	1.7	543.630	23.0793 ppm	Sc 361.383
Zr 349.619	0.043256	ppm	0.001119	2.6	1031.43	43.2557 ppm	Sc 361.383

Label	Ratio	Int. (c/s)	SD(Int)	%RSD
Sc 335.372	0.970661	52511.3	133.442	0.3
Sc 361.383	1.09021	92339.8	316.612	0.3
Sc 363.074	0.921376	18727.9	92.365	0.5
Sc 424.682	1.51722	97163.9	234.586	0.2

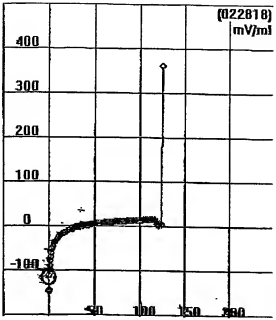


REDOX TITRATION
OF 9:1 EXTRACT
OF $(NH_4)_2Ce(NO_3)_6$ /
SALICYLIC ACID
REACTION PRODUCT

EXHIBIT
4



REDOX TITRATION OF 9:1 EXTRACT OF $(NH_4)_2Ce(NO_3)_6$ / CATECHOL REACTION PRODUCT



REDOX TITRATION
OF 9:1 EXTRACT
OF $(NH_4)_2Ce(NO_3)_6$ /
2-HYDROXY ~~NAPHTHOIC~~ NICOTINIC ACID
REACTION PRODUCT

EXHIBIT
6

PENGAD-Bayonne, N. J.